DOCUMENT RESUME

ED 104 163 FL 006 821

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TITLE Siren Songs and a Skeptic.
PUB DATE Apr 75
NOTE 15p.; Paper presented at the International Conference on Computers and the Humanities (2nd, Los Angeles, California, April 1975)

EDRS PRICE MF-$0.76 HC-$1.58 PLUS POSTAGE
DESCRIPTORS College Language Programs; *Computer Assisted Instruction; Educational Experiments; *German; Higher Education; *Individualized Instruction; Individualized Programs; Instructional Media; *Language Instruction; *Second Language Learning

ABSTRACT

This paper reports on an on-going experiment in computer-aided language instruction. In 1972, a class of beginning German students at the Duluth campus of the University of Minnesota volunteered to test two pedagogic theories: (1) Could a computer-aided course be used by a class and an instructor who knew nothing of computers and who had to rely on telephone hookups to access the program? (2) Would the computer program help individualize language instruction? Conclusions were positive on both counts. The computer-assisted instructional (CAI) program overcame some of the common objections of students to standard individualized materials. The computer component freed class sessions for greater use of the target language. Computer-supplemented language instruction helped both the instructor and the students recognize their roles in language teaching and learning. The use of dedicated telephone lines for CAI would make the positive benefits of this tool available to language teachers everywhere at acceptable costs to administrators. (Author/PMP)

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Siren Songs and a Skeptic

George M. O'Brien

For those put off by noninformative titles, it should be stated that the heart of the following is a report on the use of a computer program via long-distance lines by a class of beginning German students. I admit to two prejudices relevant to the article: a distrust of sterile statistical analyses of controlled teaching experiments and a reluctance to rely upon machinery in teaching. Most teachers of language I know share these prejudices, so to call myself a skeptic put me in good company. To show-me instructors still wary after the audio-lingual era, the claims made by advocates of individualized as well as computer-aided instruction (CAI) seem new lyrics to old siren songs. What follows is an account of the conversion of a reluctant skeptic.

In September 1972, seventeen students of beginning German at the Duluth campus of the University of Minnesota volunteered to take part in what was to be a year-long experiment. Two pedagogic theories were to be put to pragmatic test but not as controlled experiments. One was of a technical nature; could a fairly sophisticated computer program in German be used by a class and an instructor who knew nothing of computers and who were some 150 miles away from the computer, the technicians and the developers of the course? The second problem was related but distinctive; granting the potential of the computer element, to what extent might the formal structure of the beginning language

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sequence give way to individualized instruction or, placing the emphasis more accurately, to individualized learning? Several recent articles make it evident that neither problem was completely novel, but their combination was. My primary concern was that the students learn German as I had no personal commitment to the success of the various components of the course. New teaching techniques and technology which promise to aid the student without unduly burdening the instructor were to be tried.

The course materials were selected from a program developed and modified continually for a decade by Professor Cecil Wood and several colleagues at the Twin Cities campus of the University of Minnesota. The basic text, Programmed German, has a misleading title; for the course "utilizes in a systematically developed pedagogical sequence the computer, programmed workbooks, television [grammar] programs, audio tapes and visual sequences [vocabulary building skits on video tape] to organize the 'learning' phase for the student."[1] The various components may be used independent of the total package since the "teaching" phase is even more crucial than in a one-text, one-directional course. The teacher is to organize the material logically, economically and meaningfully, as Wood says. For the Duluth class only three elements from the package were chosen--the text, the audio tapes and the computer drill program. The instructor in regular classroom sessions offered grammar explanations and acted as coach for reading and conversation.

Programmed German, like any other beginning text, presents in orderly progression the total structures of German and builds

up vocabulary. It is divided into twenty-four chapters. Each contains concise grammar explanations and drills, a dialogue or letter text with vocabulary and questions based upon the text of the chapter. Programmed German contains, then, the two most manageable elements of language, vocabulary and grammatical structures. In the day of transformational linguistics, it is clear that the ability to manipulate these elements is not yet language, but such skills remain basic.[2] The grammar explanations in the text are deliberately minimal and schematic since the authors recognize that it is the nature of a teacher to elaborate adequately for a given class; or, as an alternative, the video-tape grammar lectures may be used in lieu of instructor explanation or for individual learning and review.

The limited scope of the text makes it apparent to the student that mere mastery of a book's contents will not give him genuine, even rudimentary control of German; the instructor and the classroom, the teaching phase is essential. On the other hand, it is equally clear to the student that the learning phase, his own task which cannot be done for him, consists primarily in his assimilating grammar and vocabulary. These are the aspects of the program where individualized instruction is most appropriate. To aid the Duluth students in this task, two components of the course were used, the audio cassettes and the computer program. The cassettes contain the text of the chapters and the grammar drills as is de rigueur even after the demise of the hegemony of the audio-lingual approach. The computer program consists of the grammar drills of each

chapter. Technology, in other words, was available to the student in the learning phase--in the primary individualized aspect of the course. Technology has undeniably contributed to improved language learning but is often resisted by teachers. A recent statement by George Lehmann in regard to language theory reminds us why machines have intruded upon language teaching: "It is not outrageous to say that technology has indirectly transformed the study of language and restored weight to areas within it (mathematical, logical) which an earlier philological tradition could not furnish."[3] The cassettes and computer program provided the students learning opportunities which could not be duplicated in the classroom.

Although several reports on the use of computers in language programs have been published, most language teachers have not used or even seen a computer terminal. That is the position in which I found myself when it was agreed to try out the Programmed German package at Duluth; the experiment to be worthwhile needed an uninitiated instructor. A description of the computer component seems in order. The program is located in the State of Minnesota's time-sharing educational computer in St. Paul and is accessed by telephone, so the program as such is invisible to the student. All he sees when he comes to study at the cathode-ray terminal (CRT) is a standard typewriter keyboard with a few extra keys and a television screen on top of it. After dialing a telephone number to connect with the program, what he types, appears on the screen; there greetings, text, commands and corrections from the computer also appear.

Simplicity of use is the beauty of the computer element; the student's efforts are not wasted on learning technology, nor is he distracted by the computer from his purpose, learning German grammar at his own pace. There are other plus characteristics: work is checked and corrected immediately; the computer tutor is available at any time unlike a human teacher; the student may stop at any place he wishes and continue from that point, or he may choose to review anything he has forgotten; he may skip ahead in the program after demonstrating with a few correct answers that he can handle a given problem.[4] In other words, the computer is an ever available, somewhat personal, ever patient tutor for some aspects of language learning.

In one regard it is an unrelenting taskmaster--students must spell and punctuate according to convention. Any language teacher appreciates not having to waste valuable class time and boring correction time on orthography and punctuation. Peter S. Rosenbaum mentions another obvious, but easily overlooked, advantage of CAI in language courses.[5] Each student in a classroom can respond personally to only a fraction of the drill examples, but with the computer he can do each drill under supervision albeit without the oral help an instructor would give. (What human teacher could patiently tutor every student on each example?) As a consequence, the amount of class time devoted to drill, usually about 40%--60%, can be reduced.

The pluses of the well developed CAI language course point up something important. The most common complaints about programmed learning--it does not allow for individual differences;

students are bored when they have to go through material they already know; neither reinforcement nor evaluation is immediate--are no longer problems.[6] CAI in language may indicate the way to make programmed instruction truly individualized learning.

The drills of Programmed German are substitution and cue transformations. In the former, a full sentence is presented in German, then one element in English appears below the sentence. The student is to type a new sentence incorporating the German equivalent of the English item and any necessary structural changes. If he errs the accurate part of his answer remains, and he is directed by blanks to correct the rest. Should he fail to give an acceptable answer after several attempts, the full sentence is printed out for him, and he receives a new base sentence to work on. A student who fails to generate a satisfactory sentence five times in a row is branched back to an earlier explanatory drill. Cue transformations are similar to substitutions in format; the base sentence is followed by a German word, e.g., wenn, indicating a transformation in the sentence such as word order or mood.

The students in the Duluth experiment were sollicited from those who had enrolled in the standard multi-skill beginning German sequence. The only restraint on using random selection was that volunteers had to have minimal typing skills. In the first year, we were limited to late afternoon, evening and weekend use of the University WATS lines to the computer. Since the fall of 1973, we have been sharing a dedicated WATS line with other campus users. The computer is available literally morning, noon and

night as well as on weekends and during vacation periods. The individuals who began the experiment in all other respects constituted a typical cross section of students entering beginning German. The fact that only 47% completed the year-long course compares with the overall 48% retention rate of students beginning language courses in the department. (There is no campus-wide language requirement; so students enroll in and drop out of language courses at will.)

To test the validity of the computer as a tutor for grammar drill, class met only twice a week as opposed to the four teaching sessions in the standard sequence. The students were to sign up for one language laboratory session per week to work with audio cassettes as well as to see German movies, but attendance was not checked. In addition, of course, they spent as much time as they wished working computer drills. Tests were available upon demand instead of on set dates; this was to allow for self-pacing and to conserve the diminished class time for teaching. The computer was not used for testing or grading.

Now to results and conclusions. At the end of the year, an applied examination on the four language skills, divorced from text material and instructors, was given to all students in the regular and experimental classes. The experimental group performed only as well as or poorer in all areas than those taking the conventional course. It should be hastily added, though, that the computer class did perform above the fiftieth percentile on the MLA Cooperative Foreign Language Tests. Statistics will not be given here since the bare facts do not tell the whole story.

Lessons worthy of note were learned in both technology and teaching. The first relates to technology but also partially explains the poorer performance of the experimental group. Until well into January, students were getting garbled reception on the CRT. While the class as a whole was full of esprit de corps and struggled with "Oskar" as they dubbed the terminal, several students fell behind and made only minimal use of the computer even after the problem was solved. Some switched their grading from A-F to the Pass/No-credit option which also tended to lower group performance since motivation lessened.

As a neophyte in the world of the computer, I have shied from jargon but now must try to state what was learned. After much experimentation by technicians in the Twin Cities and Duluth as well as thorough testing by the Bell System to clear the garbling, it was decided that what we were attempting, i.e., to transmit high-speed 30-character per second signals as demanded by the program, could not be done on the less expensive FXS long-distance lines. As a last half-hearted resort, a new improved telephone coupler was tried; it worked and has kept on functioning well ever since. There are several significant implications to be drawn from the fact that the garbling problem was completely solved.

1) Communication costs for distant users of sophisticated CAI programs housed at larger computer centers need not be prohibitive if there are sufficient users to share a dedicated line. For example, at Duluth the departments of sociology, chemistry and language all cooperate in using the same WATS telephone line to the

Twin Cities. Several CAI uses of long-distance lines have been successful, particularly the PLATO project in Illinois. Also the Defense Language Institute in Monterey, California conducted feasibility studies in using long-distance lines to access an IBM Russian computer program in New York. Such time-sharing arrangements as the MERITSS telephone system in the State of Minnesota are examples of what can be done. More success stories are necessary if CAI, or more accurately computer-supplemented instruction (CSI) is to become a widespread tool for accelerating and enriching student learning. As the Carnegie Commission on Instructional Technology notes, after nearly thirty years of computers on campus only 4.5% of all college students have had contact with them.[7]

2) The cost per student instructional hour decreases with more users, obviously; but this in turn makes it economically responsible for states and institutions to dedicate telephone lines exclusively to CAI/CSI and academic research. WATS lines need not be exclusively used by academia for bookkeeping and business purposes!

3) More experimentation with dedicated lines might prove an alternative to solving the computer interface problem. (There is not enough standardization in the field to bring programs easily from one installation to another.) CAI/CSI programs need not always be transferred if they can be accessed at a distance with reduced communication costs.

4) So far CAI/CSI has remained a cottage industry with professors reinventing the wheel at neighboring institutions.

Our experience shows that a well designed, full-length CSI course can be employed nearly as easily as a textbook by an instructor far removed from the mother-hen attention of the original course developer. Superior computer programs tried out simultaneously in several institutions could attract the attention of publishing firms which so far have shown little interest in the limited CSI market.

[Parenthetically it should be mentioned that EDUCOM has approached 22 universities deeply involved in computer research and CAI with a proposal for a five-year project of co-operation. This represents a path out of the cottage-industry maze characteristic of the present scene. It also points a way to future reduction of costs of computer-supplemented instruction--there could be greater numbers of users, and open competition should encourage improvement in the quality of the materials put on-line.]

What the Duluth group discovered about language teaching and learning is intimated by the shift above from "computer-aided" to "computer-supplemented" instruction. While it may be true that students cannot be taught grammar and vocabulary but must learn these by themselves, the instructor and students agreed at the end of the year that there is a need for more class contact hours. However, this time should not be spent practicing drills, duplicating what the computer program does well. Students who worked through the program had adequate grammar control and chided the instructor for wasting class time on drill. What they suggested and what future students have been getting is free discussion and use of the language, the chance to generate German with the aid of the teacher.

The old Adam, rechristened "Motivation," is still around. Students said they would prefer set dates for finishing chapters and writing tests to prod them to learn. As one girl put it: "I liked the idea of working on my own, but at times this was almost too convenient when it came to conflicts. Somehow it was always more convenient to do my German the next day." The computer tutor, however, produced one unexpected result related to motivation. Three students who fell behind and did not register for winter and spring quarters still worked periodically at the terminal and progressed in the programmed text though the instructor never saw them again. The common confusion as to the learner's role--a problem related to motivation--was clarified by the programmed computer approach. Students admitted that the need to work through the computer program for success in the class made their own learning role clear to them. The fact that the text or teacher may have explained a point well was not equated, as is often the case, with the student's need to learn the point by practice. Students were weaned from the textbook and the instructor.

This marks a good place to conclude. I started as a skeptic but found that I, too, by fighting with the computer was learning what it is an instructor can and should do in a beginning language course. I have remained eclectic in teaching as I now know better when and what a student can learn from sources other than myself. Thanks to a group of volunteer students, Cecil Wood et al. and "Oskar" the computer, the next classes using CSI have had more classroom opportunity to generate German.

Isn't that what language teaching is all about?

Footnote: Currently at the University of Minnesota several CAI language programs are in use. All have been built upon Cecil Wood's insight and trial-and-error development of the proto-course in German. The programs are in the less frequently taught languages such as Modern Greek, Norwegian and Dutch (although a text-independent grammar program in Spanish will go on-line this spring). CAI via telephone hookups may be one way of offering less commonly taught languages nationwide; that would be a fitting memorial to Cecil Wood who, in spite of the distractions of linguistic wars and computer technology, remained at heart an Old Norse scholar.

University of Minnesota, Duluth
April 1975

NOTES

[1] Cecil Wood, "Evaluation of Self-Paced Instruction in German," Development and Experiment in College Teaching, Report No. 9 (Spring 1973), p. 18.

[2] In Computer Handbook for Programmed German (Minneapolis: University of Minnesota, 1971), p. 17, Wood says: "There is a real discrepancy between homo sapiens' performance with an algorithmic problem of vocabulary plus grammar and his performance with the problem of vacabulary plus grammar plus the simultaneous problem of semantic intent. It is not at all clear when grammar plus vocabulary plus semantic intent have induced language in homo sapiens just what happened." The Media-Aided Language Programs on the Twin Cities campus under Cecil Wood, Gerhard Clausing and Russell Burris of the Center for Programmed Learning are a search for answers to aspects of this central problem.

[3] "The relation of lit. [sic] to lang.," Times Literary Supplement, 25 May 1973, p. 594, col. 3.

[4] The advantages noted here accord with those enumerated by others for CAI language courses, especially: John R. Allen, "Individualizing Foreign Language Instruction with Computers at Dartmoutn," FLAnnals, Vol. 5/3 (March 1972), p. 348. and Ronald L. Gougher, "Individualizing of Foreign Language Learning: What Is Being Done," in Britannica Review of Foreign Language Education, Vol. 3, 1970,

ed. Dale L. Lange (Chicago: Encyclopaedia Britannica, 1971) p. 234.

[5] "The Computer as a Learning Environment for Foreign Language Instruction," FLAnnals, Vol. 2/4 (May 1969), p. 457.

[6] A similar point is made by: Jermaine R. Arndt, "Media in Foreign Language Teaching," in Britannica Review of Foreign Language Education, Vol. 2, 1970, ed. Dale L. Lange (Chicago: Encyclopaedia Britannica, 1970) p. 182.

[7] The Carnegie Commission on Higher Education, The Fourth Revolution: Instructional Technology in Higher Education. (New York: Mcgraw-Hill, 1972) p. 25.

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